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**APPLICATION NUMBER: 60/549,825**

**FILING DATE: *March 03, 2004***

**RELATED PCT APPLICATION NUMBER: *PCT/US05/07057***



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Under Secretary of Commerce  
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# PROVISIONAL APPLICATION COVER SHEET

This is a request for filing a PROVISIONAL APPLICATION under 37 CFR 1.53 (b)(2)

Docket Number	81,648	Type a plus sign (+) inside this box →	+
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INVENTOR(s)/APPLICANT(s)			
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19249 U.S. PTO  
60/549825

TITLE OF THE INVENTION (280 characters max)

CROP OIL CONCENTRATE ADJUVANTS CONTAINING AMINE SURFACTANTS

CORRESPONDENCE ADDRESS

Legal Department  
Huntsman LLC  
P.O. Box 15730

STATE	Austin, Texas	ZIP CODE	78761	COUNTRY	USA
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ENCLOSED APPLICATION PARTS (check all that apply)

☒ Specification      Number of Pages 13      ☐ Small Entity Statement  
☐ Drawing(s)      Number of Sheets \_\_\_\_\_      ☒ Other (specify) Postcard

METHOD OF PAYMENT (check one)

☐ A check or money order is enclosed to cover the Provisional filing fees

☒ The Commissioner is hereby authorized to charge the filing fee to  
Deposit Account Number: 08-3442

PROVISIONAL FILING FEE AMOUNT

\$ 160.00

The invention was made by an agency of the United States Government or under a contract with an agency of the United States Government.

☒ No.  
☐ Yes, the name of the U.S. Government agency and the Government contract number are:

Respectfully submitted,

SIGNATURE

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3/3/04

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37,469

☐

Additional inventors are being named on separately numbered sheets attached hereto.

## Certificate of Mailing By Express Mail

I hereby certify that this correspondence is being deposited with the U.S. Postal Service Express Mail Service No. EV165093914US addressed to Commissioner for Patents, Alexandria, VA 22313 on March 3, 2004.

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PROVISIONAL APPLICATION FILING ONLY

## **Crop Oil Concentrate Adjuvants Containing Amine Surfactants**

### **Technical Field**

The present invention is concerned with compositions and uses of amine surfactants incorporated into crop oil concentrate (COC) adjuvants for use with various herbicides, especially glyphosate.

### **Background Information**

It is known in the art that surfactants are included in COCs. They function to emulsify the oil when diluted into water in the spray tank and can also be incorporated as wetters to help the spray solution spread on the target once it is applied.

### **Summary of the Invention**

The present invention is concerned with incorporation of surfactants with amine chemistries as both emulsifier and wetter. Surfactants with amine chemistries are known to maximize the efficacy of several herbicides, especially glyphosate. By using amine chemistry surfactants in COCs that are tank mixed with pesticides that benefit from the presence of amine chemistry surfactants, the surfactants in the COCs will provide dual roles in the final spray solution. They will emulsify and wet the crop oil, and they will also increase the efficacy of the active ingredient.

### **Detailed Description**

The specific surfactants used include alkyl amine ethoxylates and alkyl ether amine ethoxylates. Other amine chemistry surfactants such as polyetheramine and ethylenediamine based chemistries are useful in accordance with the present invention. The aforesaid compounds have been successfully formulated in crop oil concentrates with various paraffinic oils. In addition, formulations with EXXSOL® D130 and ester solvents EXXATE® series solvents also available from Exxon are useful. A composition according to the invention can include other surfactant chemistries, other crop oils, and optionally additional formulation components known in the art.

Huntsman COC-1

Component	w/w%
EXXSOL® D-130	60.0
PEL 24-3	28.0
SURFONIC® C-2	4.5
SURFONIC® T-10	5.5
Water	2.0

Huntsman COC-2

Component	w/w%
EXXSOL® D-130	60.0
PEL 24-3	30.0
SURFONIC® PEA-25	8.0
Water	2.0

EXXSOL® D-130 is a dearomatized hydrocarbon fluid available from ExxonMobil Chemical. PE L24-3 is a phosphate ester of SURFONIC® L24-3 surfactant available from Huntsman LLC of Austin, Texas. Any phosphate esters thereof are suitable for use in the present invention. SURFONIC® C-2 is a 2-mole ethoxylate of cocoamine available from Huntsman LLC of Austin, Texas. SURFONIC® T-10

is a 10-mole ethoxylate of Tallowamine available from Huntsman LLC of Austin, Texas. SURFONIC® PEA-25 is an alkyl polyetheramine ethoxylate available from Huntsman LLC of Austin, Texas.

Unexpected results of the invention include the fact that the efficacy of active ingredient is improved by choice of adjuvant surfactant chemistry formulated into companion crop oil concentrate. Efficacy is improved past expectations from crop oil alone.

A field trial was performed with blinded sample numbers. A protocol summary of the field trial is given below:

## Evaluation of Huntsman COC's with Assure® and Roundup® Original

### Trial Establishment Guidelines

**Objective:** Evaluate the performance of Huntsman crop oil concentrates compared to Agrilience HI-PER-OIL with Assure II and Roundup Original® in Roundup Ready® soybeans.

#### Target Weeds

Code	Common Name	Scientific Name
IPOSS	Morningglory	<i>Ipomoea spp.</i>
ABUTH	Velvetleaf	<i>Abutilon theophrasti</i>
AMASS	Pigweed	<i>Amaranthus spp.</i>
SIDSP	Teaweed	<i>Sida spinosa</i>
SORVU	Shattercane	<i>Sorghum bicolor</i>
SETFA	Giant foxtail	<i>Setaria faberi</i>
ZEAMX	Volunteer RR corn	<i>Zea mays</i>

#### Target Crop

Code	Crop Common Name
GLXMA	Roundup Ready® soybean <i>Glycine max</i>

**Geographic Area/Environmental Considerations:** Overhead irrigation is not required, but should be supplied if drought conditions threaten loss of data.

#### General Comments

Insure adequate broadleaf weed distribution and density by broadcasting Roundup Ready® corn seed, morning glory, velvetleaf, pigweed and prickly sida weed seeds just before the final seedbed preparation (field cultivator and/or harrow).

Plant Roundup Ready® soybeans in 30" rows. Traditional (30") row width is requested to allow maximum opportunity for emergence and aggressive growth of indigenous broadleaf weeds.

Plot size is 4 rows by 30 feet. Arrange in RCB design with 4 replications. Apply treatments in 20 gal/A spray volume.

Apply experimental treatments when most broadleaf weeds are in the 3- to 6-leaf stage. At the time of application; record the stage (number of leaves), height and density (#/sq ft or sq meter) of each broadleaf weed species that is present in sufficient density and distribution for good assessment. This data should be taken from the two center row-centers of each non-treated control plot.

Assess phytotoxicity to the crop at 2, 10 and 21 days after treatment. Include a description of the injury symptom and scale used for the assessment, i.e., necrotic leaf spots assessed as percent of leaf surface afflicted, percent crop height reduction, etc.

Assess percent (%) control of each weed species at 10 and 21 days after treatment.

Crop yield is not measured.

Treatments to be Evaluated:

<u>No.</u>	<u>Name</u>	<u>Form</u>	<u>Type</u>	<u>Rate</u>	<u>Unit</u>
1	Control				
2	Assure II	0.88	EC	4 fl oz/A	
3	Assure II	0.88	EC	4 fl oz/A	
	HI-PER-OIL			0.5 % V/V	
4	Assure II	0.88	EC	2 fl oz/A	
	HI-PER-OIL			0.5 % V/V	
5	Assure II	0.88	EC	4 fl oz/A	
	Huntsman COC 1			0.5 % V/V	
6	Assure II	0.88	EC	2 fl oz/A	
	Huntsman COC 1			0.5 % V/V	
7	Assure II	0.88	EC	4 fl oz/A	
	Huntsman COC 2			0.5 % V/V	
8	Assure II	0.88	EC	2 fl oz/A	
	Huntsman COC 2			0.5 % V/V	
9	Assure II	0.88	EC	4 fl oz/A	
	Roundup Original	4	EC	16 fl oz/A	
10	Assure II	0.88	EC	4 fl oz/A	
	Roundup Original	4	EC	16 fl oz/A	
	HI-PER-OIL			0.5 % V/V	
11	Assure II	0.88	EC	2 fl oz/A	
	Roundup Original	4	EC	8 fl oz/A	
	HI-PER-OIL			0.5 % V/V	
12	Assure II	0.88	EC	4 fl oz/A	
	Roundup Original	4	EC	16 fl oz/A	
	Huntsman COC 1			0.5 % V/V	
13	Assure II	0.88	EC	2 fl oz/A	

	Roundup Original	4 EC	8 fl oz/A
	Huntsman COC 1		0.5 % V/V
14	Assure II	0.88 EC	4 fl oz/A
	Roundup Original	4 EC	16 fl oz/A
	Huntsman COC 2		0.5 % V/V
15	Assure II	0.88 EC	2 fl oz/A
	Roundup® Original	4 EC	8 fl oz/A
	Huntsman COC 2		0.5 % V/V

Product quantities required for listed treatments and applications in one trial:

<u>Amount</u>	<u>Unit</u>	<u>Product</u>
44.0 ml		Assure® II 0.88 EC
51.2 ml		HI-PER-OIL
51.2 ml		Huntsman COC 1
51.2 ml		Huntsman COC 2
88.0 ml		Roundup Original® 4 EC

Calculations based on 20 gal/A spray volume, mix size= 2.565 liters.



Evaluation of Huntsman COCs with Assure and Roundup Original - continued

Protocol Spray Sheet

Reps: 4

Plots: 10 by 30 feet

Spray Vol: 20 gal/ac

Mix Size: 2.565 liters

No.	Name	Form	Type	Rate	Unit	to Measure
1	Control					
2	Assure II	0.88	EC	4 fl oz/A		4.0 ml
3	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	HI-PER-OIL			0.5 % V/V		12.8 ml
4	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	HI-PER-OIL			0.5 % V/V		12.8 ml
5	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Huntsman COC 1			0.5 % V/V		12.8 ml
6	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	Huntsman COC 1			0.5 % V/V		12.8 ml
7	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Huntsman COC 2			0.5 % V/V		12.8 ml
8	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	Huntsman COC 2			0.5 % V/V		12.8 ml
9	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Roundup Original	4	EC	16 fl oz/A		16.0 ml
10	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Roundup Original	4	EC	16 fl oz/A		16.0 ml
	HI-PER-OIL			0.5 % V/V		12.8 ml
11	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	Roundup Original	4	EC	8 fl oz/A		8.0 ml
	HI-PER-OIL			0.5 % V/V		12.8 ml
12	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Roundup Original	4	EC	16 fl oz/A		16.0 ml
	Huntsman COC 1			0.5 % V/V		12.8 ml
13	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	Roundup Original	4	EC	8 fl oz/A		8.0 ml
	Huntsman COC 1			0.5 % V/V		12.8 ml
14	Assure II	0.88	EC	4 fl oz/A		4.0 ml
	Roundup Original	4	EC	16 fl oz/A		16.0 ml
	Huntsman COC 2			0.5 % V/V		12.8 ml
15	Assure II	0.88	EC	2 fl oz/A		2.0 ml
	Roundup Original	4	EC	8 fl oz/A		8.0 ml
	Huntsman COC 2			0.5 % V/V		12.8 ml

Assure II and Roundup Original® were the active ingredients tested.

### Weed Species Studied

ZEAMX = Volunteer Roundup Ready® field corn

SORVU = shattercane (*Sorghum bicolor*)

IPOSS = morningglory (*Ipomoea* spp.)

ABUTH = velvetleaf (*Abutilon theophrasti*)

AMATU = tall waterhemp (*Amaranthus tuberculatus*)

SIDSP = prickly sida [a.k.a. teaweed] (*Sida spinosa*)

Results of the field trial are in the attached 10-Day and 21-Day tables:

### 10 DAY

#### Evaluation of Huntsman Surfactants with Assure on Roundup Ready Soybeans

Weed Code			ZEAMX	SORVU	IPOSS	ABUTH	AMATU	SIDSP
Crop Code		GLXMA						
Rating Data Type		PHYGEN	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit		%	%	%	%	%	%	%
Rating Date		7/10/2003	7/10/2003	7/10/2003	7/10/2003	7/10/2003	7/10/2003	7/10/2003
Weed Stage			7 leaf	6 leaf	9 leaf	9 leaf	9 leaf	9 leaf
Trt-Eval Interval			10 DA-A	10 DA-A	10 DA-A	10 DA-A	10 DA-A	10 DA-A
Treatment	Rate	Plot						
Control		101	0	0	0	0	0	0
		206	0	0	0	0	0	0
		310	0	0	0	0	0	0
		404	0	0	0	0	0	0
		avg	0	0	0	0	0	0
Assure II	4	102	0	60	70	0	0	0
		204	0	70	85	0	0	0
		312	0	70	80	0	0	0
		408	0	75	80	0	0	0
		avg	0	69	79	0	0	0
Assure II Huntsman COC -1	4	105	0	80	90	0	0	0
	0.5	208	0	85	85	0	0	0
		313	0	85	90	0	0	0
		412	0	80	85	0	0	0
		avg	0	83	88	0	0	0
Assure II Huntsman COC -1	2	106	0	60	80	0	0	0
	0.5	207	0	80	80	0	0	0
		309	0	85	90	0	0	0
		414	0	85	90	0	0	0
		avg	0	78	85	0	0	0
Assure II Huntsman COC-2	4	107	0	80	90	0	0	0
	0.5	211	0	80	85	0	0	0
		308	0	85	85	0	0	0
		415	0	80	85	0	0	0
		avg	0	81	86	0	0	0
Assure II	2	108	0	70	80	0	0	0

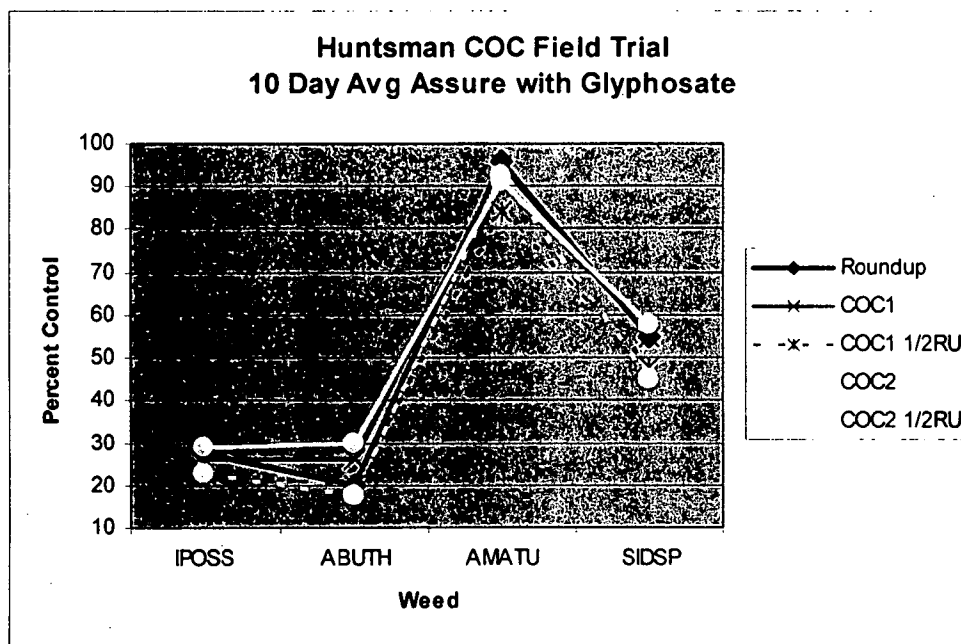
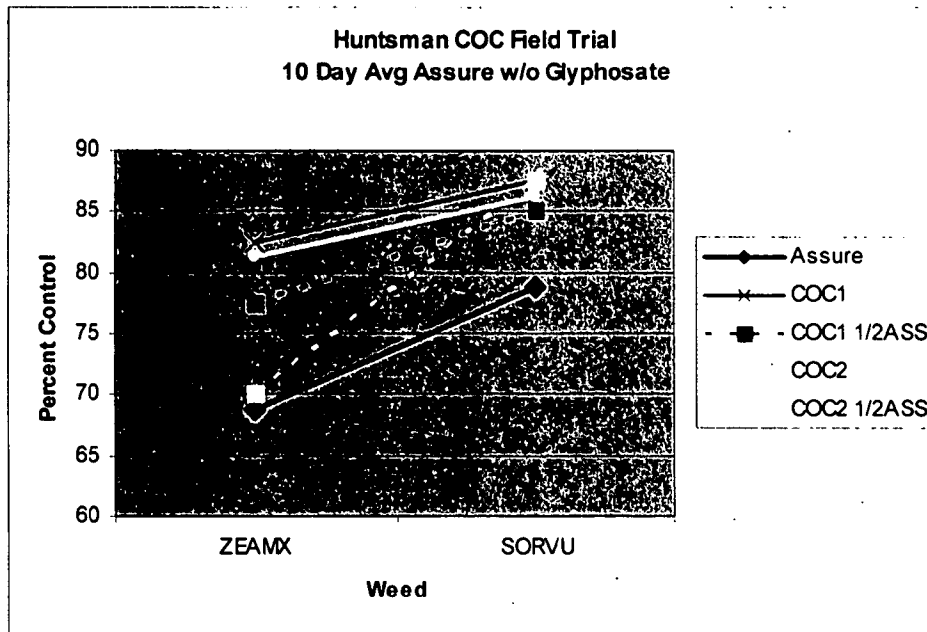
Huntsman COC-2	0.5	212	0	80	90	0	0	0	0
		305	0	70	90	0	0	0	0
		401	0	60	90	0	0	0	0
		avg	0	70	88	0	0	0	0
Assure II	4	109	0	80	90	20	20	95	40
Roundup Original®	16	202	0	60	90	20	20	95	70
		301	0	80	85	40	20	95	50
		410	0	80	85	30	20	98	60
		avg	0	75	88	28	20	96	55
Assure II	4	112	0	80	90	30	20	95	60
Roundup Original®	16	214	0	85	85	30	30	95	40
Huntsman COC									
7945-94-1	0.5	311	0	80	90	20	30	95	60
		406	0	75	90	25	25	95	60
		avg	0	80	89	26	26	95	55
Assure II	2	113	0	80	85	20	20	95	60
Roundup Original®	8	203	0	70	90	30	20	90	50
Huntsman COC-1	0.5	304	0	80	80	20	20	70	50
		402	0	75	90	20	20	80	30
		avg	0	76	86	23	20	84	48
Assure II	4	114	0	85	90	20	20	95	50
Roundup Original	16	213	0	85	90	40	40	95	60
Huntsman COC-2	0.5	307	0	85	90	20	30	85	60
		405	0	80	90	35	30	90	60
		avg	0	84	90	29	30	91	58
Assure II	2	115	0	70	90	30	20	95	40
Roundup Original	8	209	0	80	90	20	20	90	40
Huntsman COC -2	0.5	315	0	60	90	20	10	90	50
		411	0	85	85	20	20	95	50
		avg	0	74	89	23	18	93	45

## 21 DAY

### Evaluation of Huntsman Surfactants with Assure on Roundup Ready® Soybeans

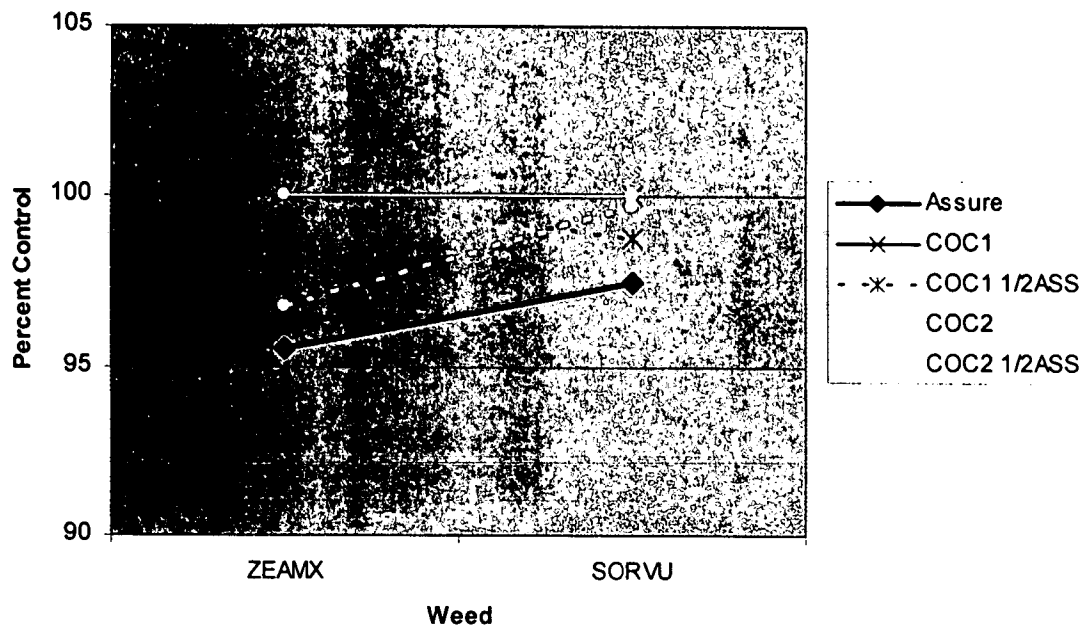
Weed Code			ZEAMX	SORVU	IPOSS	ABUTH	AMATU	SIDSP
Crop Code		GLXMA						
Rating Data Type		PHYGEN	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO	CONTRO
Rating Unit		%	%	%	%	%	%	%
Weed Stage			8 leaf	8 leaf	9+ leaf	9+ leaf	9+ leaf	9+ leaf
Trt-Eval Interval		21 DA-A	21 DA-A	21 DA-A	21 DA-A	21 DA-A	21 DA-A	21 DA-A
Treatment	Rate	Plot						
Control		101	0	0	0	0	0	0
		206	0	0	0	0	0	0
		310	0	0	0	0	0	0
		404	0	0	0	0	0	0
		avg	0	0	0	0	0	0
Assure II	4	102	0	90	95	0	0	0
		204	0	100	100	0	0	0
		312	0	92	100	0	0	0
		408	0	100	95	0	0	0
		avg	0	95.5	97.5	0	0	0
Assure II	4	105	0	100	100	0	0	0

Huntsman COC-1	0.5	208	0	100	100	0	0	0	0
		313	0	100	100	0	0	0	0
		412	0	100	100	0	0	0	0
		avg	0	100	100	0	0	0	0
Assure II	2	106	0	100	95	0	0	0	0
Huntsman COC-1	0.5	207	0	100	100	0	0	0	0
		309	0	100	100	0	0	0	0
		414	0	100	100	0	0	0	0
		avg	0	100	98.75	0	0	0	0
Assure II	4	107	0	100	100	0	0	0	0
Huntsman COC-2	0.5	211	0	100	100	0	0	0	0
		308	0	100	100	0	0	0	0
		415	0	100	100	0	0	0	0
		avg	0	100	100	0	0	0	0
Assure II	2	108	0	99	100	0	0	0	0
Huntsman COC-2	0.5	212	0	100	100	0	0	0	0
		305	0	92	100	0	0	0	0
		401	0	96	99	0	0	0	0
		avg	0	96.75	99.75	0	0	0	0
Assure II	4	109	0	100	100	50	50	95	60
Roundup Original®	16	202	0	100	100	60	50	95	60
		301	0	100	100	60	40	95	50
		410	0	100	100	50	40	95	50
		avg	0	100	100	55	45	95	55
Assure II	4	112	0	100	100	60	60	95	50
Roundup Original®	16	214	0	100	100	60	60	92	50
Huntsman COC-1	0.5	311	0	100	100	60	60	95	60
		406	0	100	100	60	60	90	60
		avg	0	100	100	60	60	93	55
Assure II	2	113	0	100	100	50	50	90	50
Roundup Original®	8	203	0	100	100	50	40	90	50
Huntsman COC-1	0.5	304	0	100	100	40	50	85	40
		402	0	100	100	50	50	85	50
		avg	0	100	100	47.5	47.5	87.5	47.5
Assure II	4	114	0	100	100	40	40	92	60
Roundup Original ®	16	213	0	100	100	60	60	95	60
Huntsman COC-2	0.5	307	0	100	100	60	70	95	60
		405	0	100	100	65	70	85	60
		avg	0	100	100	56.25	60	91.75	60
Assure II	2	115	0	100	99	50	30	95	50
Roundup Original®	8	209	0	100	100	40	60	90	50
Huntsman COC-2	0.5	315	0	100	100	40	40	92	60
		411	0	100	100	60	50	95	50
		avg	0	100	99.75	47.5	45	93	52.5

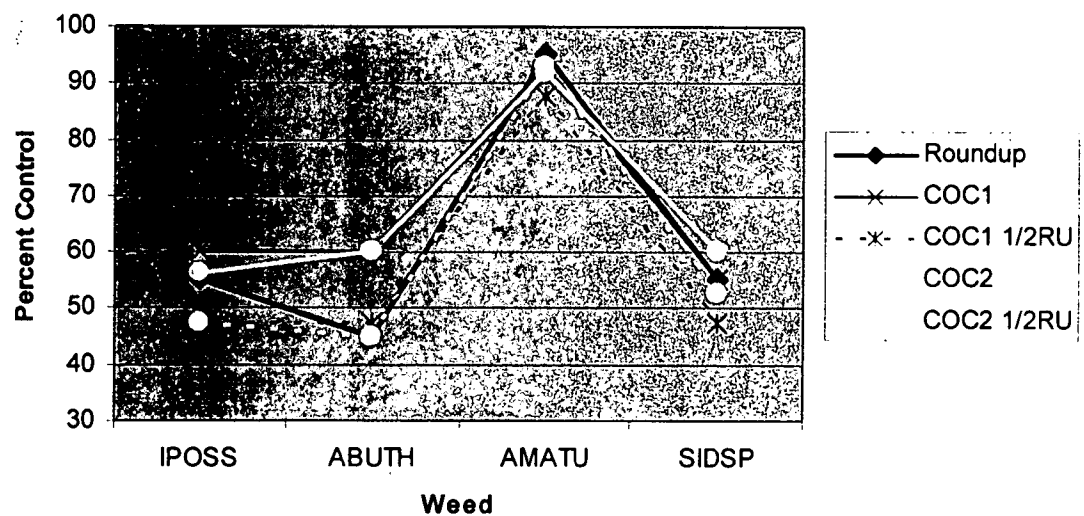


Ten Day Average Readings

### Huntsman COC Field Trial 21 Day Avg Assure w/o Glyph



### Huntsman COC Field Trial 21 Day Avg Assure with Glyphosate



Twenty-one Day Average Readings

Ten-Day Conclusions for Assure w/o glyphosate: Efficacy of Assure II at full rates was improved by using COCs COC1 and COC2 on both ZEAMX and SORVU. After cutting Assure rates in half, efficacy on both ZEAMX and SORVU using COC-1 was almost retained at the full rate with COC, and was significantly above full rate w/o COC. After cutting Assure rates in half, efficacy on ZEAMX using COC-2 was slightly lower than full rate with COC, but was still above full rate w/o COC. Efficacy on SORVU using COC-2 was retained at the full rate with COC, and was significantly above full rate w/o COC.

Ten-Day Conclusions for Assure with glyphosate: Data is not significantly different within individual weed species.

Twenty-one-Day Conclusions for Assure w/o glyphosate: Efficacy of Assure II at full rates was improved by using both COCs on both ZEAMX and SORVU. After cutting Assure rates in half, efficacy on both ZEAMX and SORVU using both COCs was almost retained at the full rate with COC, and was above the full rate w/o COC.

Twenty-one-Day Conclusions for Assure with glyphosate: On IPOSS, efficacy was slightly improved with COCs at full glyphosate rate, and only slightly less than full rate when glyphosate rate was cut in half. For ABUTH, efficacy was improved with COCs at full glyphosate rate, and equal to the full rate when glyphosate rate was cut in half. For AMATU, efficacies were not significantly different for glyphosate at full rate, glyphosate plus COCs at full rate, and COC-2 with glyphosate at half rate. Efficacy was only slightly reduced with COC-1 and glyphosate at half rate. For SIDSP, COC-2 improved efficacy over glyphosate at full rate, and matched efficacy of glyphosate at full rate w/o COC when glyphosate rate was cut in half. COC-1 matched full glyphosate efficacy at full glyphosate rate, but COC-1 efficacy at half glyphosate rate was slightly reduced.

What is claimed is:

- 1) COCs comprising one or more amine surfactant chemistries.
- 2) Claim 1 where surfactant is an alkyl amine alkoxylate.
- 3) Claim 2 where surfactant is a tallow amine ethoxylate.
- 4) Claim 1 where surfactant is a polyetheramine alkoxylate.
- 5) Claim 4 where surfactant is an alkyl polyetheramine ethoxylate.
- 6) Claim 1 where surfactant is an alkyl diamine alkoxylate.
- 7) Claim 6 where surfactant is an ethylene diamine alkoxylate.
- 8) The method of controlling weeds by diluting composition according to any foregoing claim into a spray tank with one or more pesticides and applying to a plant.